



MICROALBUMINURIA, REMAINS UNNOTICED IN OBESITY - A CASE CONTROL STUDY

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ABSTRACT **BACKGROUND:** Microalbuminuria which occurs due to specific glomerular damage or is the marker of generalized endothelial cell dysfunction is more common among obese individuals or not is an ever ending debate. Thus this study aimed to assess the presence of microalbuminuria among obese persons and non obese individuals, who were free from metabolic disorders. **METHODS:** A case control study was conducted among patients attending outpatient department of general medicine in Meenakshi Medical college Hospital and Research Institute, Kanchipuram, for their illnesses from January 2019 to January 2020. A total of sixty participants with thirty obese cases and thirty non obese controls were included in this study. Detailed history and examination was done by the principal investigator and the same was documented in a proforma. Data entry was done using Microsoft excel and the statistical analysis includes odds ratio were calculated using Statistical Package for Social Sciences (SPSS) software version 18. **RESULTS:** Among the study participants, 30% and 5% had Microalbuminuria in obese and non obese group, respectively. Also obese participants were 9.3 times at higher chances of having microalbuminuria when compared to the non obese patients with significant p value ($p=0.0065$). **CONCLUSIONS:** Microalbuminuria can be used to predict the risk of renal complications in obese subjects in order to bring down the overall morbidity and mortality related to renal function.

KEYWORDS : Obese, Non Obese, Microalbuminuria, Euglycemic, Normotensive

INTRODUCTION

The worst renal complication to be associated with obesity could be renal cell carcinoma¹. Effect of obesity on renal function depicts in terms of albuminuria and blood pressure was reported in 1923². Literature states that hemodynamic changes characteristic of a hyperfiltering glomerulus in human beings, whose first clinical sign of kidney injury was reported as increased albuminuria³. Microalbuminuria, defined as an urine albumin to urine creatinine ratio (UACR) of 30 to ≤ 300 mcg/mg⁴. Compared to normal subjects, in severely obese individuals the GFR and renal plasma flow were reported to be higher⁵. Evidence also exists for a role of obesity-induced increase in renal sympathetic tone that could contribute and aggravate these hemodynamic changes⁶. A significant correlation between increased urinary albumin excretion and body weight has been shown in both nondiabetic and diabetic overweight individuals⁷. But literatures are minimal while comparing healthy obese individuals (without any disorders of metabolic syndrome) and non obese individuals.

OBJECTIVES

To assess the presence of microalbuminuria among obese persons and non obese individuals, who were euglycaemic and normotensive.

METHODS

This case control study was conducted among the cases attending OPD of general medicine in Meenakshi Medical college Hospital and Research Institute, Kanchipuram, from January 2019 to January 2020. Cases aged between 18-60 years who were free from any metabolic disorders including diabetes mellitus and hypertension. Controls were matched for age (± 2 years) and gender. A total of eighty participants with forty obese cases and forty non obese controls were included in this study.

After taking the written informed consent from the study participants, for their participation in this study, detailed history and examination was done by the principal investigator and the same was documented in a proforma. In the examination, height, weight, waist circumference and hip circumferences were assessed. Reference ranges⁸ for waist hip ratio and waist circumference among males and females are shown in the table 1.

Table 1: Acceptable and unacceptable range⁸

Gender	Acceptable	Unacceptable
Waist Hip Ratio (WHR)		

Male	≤ 0.90	> 0.90
Female	≤ 0.80	> 0.80
Waist Circumference (WC) 10		
Male	≤ 102 cms	> 102 cms
Female	≤ 88 cms	> 88 cms

Data entry was done using Microsoft excel and the statistical analysis includes chi square test and odds ratio were calculated using Statistical Package for Social Sciences (SPSS) software version 18. P value < 0.05 , is considered a statistically significant.

RESULTS

In the present study, since the cases and controls were matched for age and gender, there were 46.7%, 40%, 10% and 3.3% of cases and controls in the age group of less than or equal to 40 years, 41-50 years, 51-60 years and more than 60 years, respectively. Similarly there were 40% and 60% of cases and controls were males and females, respectively.

Table 2: Demographic characteristics of participants

Variables	Obese patients (N=30)	Non obese patients (N=30)
Age group		
≤ 40 years	14 (46.7)	14 (46.7)
41-50 years	12 (40)	12 (40)
51-60 years	03 (10)	03 (10)
>60 years	01 (3.3)	01 (3.3)
Sex		
Male	12 (40)	12 (40)
Female	18 (60)	18 (60)

Among the study participants, 85.7% and 14.3% had microalbuminuria in obese and non obese group, respectively. Also obese participants were 9.3 times at higher chances of having microalbuminuria when compared to the non obese patients with significant p value ($p=0.0065$)

Table 3: Association between MAU in cases and control groups

Group	Microalbuminuria Present	Microalbuminuria Absent	Odds ratio	95% CI	P value
Obesity (Cases)	12 (85.7)	18 (39.1)	9.3	1.9-46.7	0.0065
Non Obese (Control)	02 (14.3)	28 (60.9)			
Total	14 (100)	46 (100)			

***Significant**

On assessing the association between BMI and microalbuminuria among the obese cases, there were 66.7% and 33.3% of cases with microalbuminuria among obese cases with BMI categories 30.1-32 and 32.2-34, respectively. Similarly there were 65.2% and 13% of cases without microalbuminuria among the cases in BMI categories 30.1-32 and 32.2-34, respectively. The association between BMI and microalbuminuria among the obese cases was found to be statistically significant.

Table 4: Association between BMI and MAU in obese group

BMI	Microalbuminuria		P value
	Present	Absent	
30.1-32.0	08 (66.7)	15 (65.2)	0.0242*
32.1-34.0	04 (33.3)	03 (13.0)	
Total	12 (100)	23 (100)	

***Significant**

Among obese males who were reported to have microalbuminuria, there were 75% and 25% of cases with acceptable and unacceptable ranges of WHR whereas there were 37.5% and 62.5% of cases without microalbuminuria among obese males in acceptable and unacceptable ranges of WHR. Also among the cases with microalbuminuria, 50% of cases reported to have acceptable and unacceptable WC, each and 37.5% and 62.5% were found to have acceptable and unacceptable ranges of WC among the obese males without microalbuminuria. The association between WHR, WC and MAU among obese males was found to be statically insignificant.

Table 5: Association between WHR, WC and MAU in male obese cases

Variables	Microalbuminuria		P value
	Present	Absent	
WHR			
Acceptable	03 (75)	03 (37.5)	0.2206
Unacceptable	01 (25)	05 (62.5)	
Total	04 (100)	08 (100)	
WC			
Acceptable	02 (50)	03 (37.5)	0.6788
Unacceptable	02 (50)	05 (62.5)	
Total	04 (100)	08 (100)	

Among obese females who were reported to have microalbuminuria, there were 25% and 75% of cases with acceptable and unacceptable ranges of WHR whereas there were 40% and 60% of cases without microalbuminuria among obese females in acceptable and unacceptable ranges of WHR. Also among the cases with microalbuminuria, 37.5% and 62.5% of cases reported to have acceptable and unacceptable WC and 50% of cases were found to have acceptable and unacceptable ranges of WC, each among the obese females without microalbuminuria. The association between WHR, WC and MAU among obese females was found to be statically insignificant.

Table 6: Association between WHR, WC and MAU in female obese cases

Variables	Microalbuminuria		P value
	Present	Absent	
WHR among females			
Acceptable	02 (25)	04 (40)	0.5023
Unacceptable	06 (75)	06 (60)	
Total	08 (100)	10 (100)	
WC among females			
Acceptable	03 (37.5)	05 (50)	0.5958
Unacceptable	05 (62.5)	05 (50)	
Total	08 (100)	10 (100)	

DISCUSSION

Weight loss has been associated with a decrease in AER among obese individuals with overt diabetic nephropathy and among individuals without diabetes and with severe obesity⁹. Chang et al¹⁰ reported that mean BMI, WC, and SBP were significantly higher in subjects with microalbuminuria than in those without microalbuminuria. Hoffmann et al¹¹ performed a study and reported that they could not find any significant differences in the urinary albumin excretion among the lean, overweight and obese individuals. Cirillo et al¹² conducted a study and reported that plasma cholesterol levels and body mass index was found to be significantly related to urinary albumin excretion and prevalence of microalbuminuria. Niels et al¹³ performed a study and reported that albumin excretion rate in obese subjects could be as good

as an early predictor of complications as it is in patients with diabetes mellitus, and in the elderly. In contrast to the present study, Chowta et al¹⁴ conducted a study and reported that there was no effect of BMI and sex on the prevalence of microalbuminuria. However, the significant positive correlation was reported between body mass index and microalbuminuria was reported in another study among patients with hypertension¹⁵.

CONCLUSION

Obese individuals are more prone to have microalbuminuria. Hence Microalbuminuria can be used to predict the risk of renal complications in obese subjects in order to bring down the overall morbidity and mortality related to renal function.

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